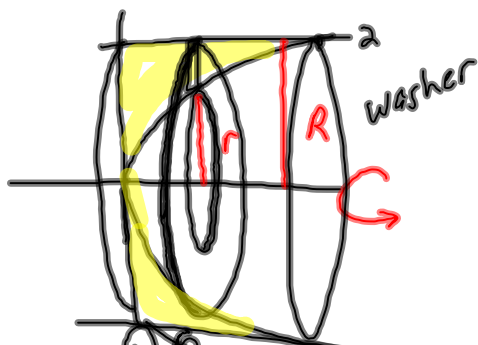
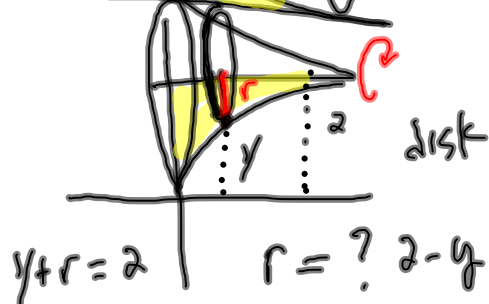


29 $y = \sqrt{x}$ $y = 2$ $x = 0$ rotate around x -axis
 c) $y = 2$



$$R = 2 \quad r = \sqrt{x}$$

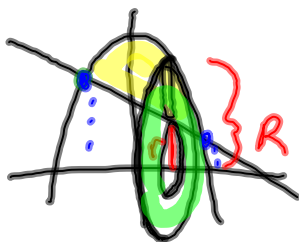
$$\int_0^4 \pi \cdot 2^2 - \pi (\sqrt{x})^2 dx = 8\pi$$



$$\int_0^4 \pi (2 - \sqrt{x})^2 dx = \frac{8\pi}{3}$$

Jan 20-9:33 AM

18. about x -axis $y = 4 - x^2$ $y = 2 - x$



$$R = 4 - x^2 \quad r = 2 - x$$

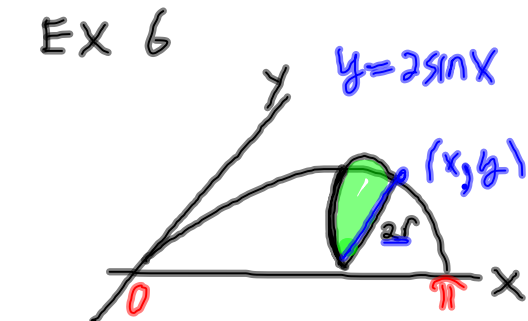
$$\int_{-1}^2 \pi (4 - x^2)^2 - \pi (2 - x)^2 dx$$

$$4 - x^2 = 2 - x$$

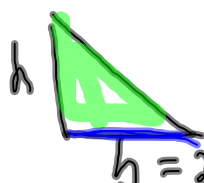
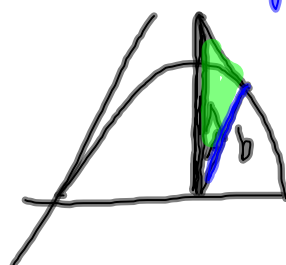
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7.3 b volumes of known cross section volumes of revolution with shells

EX 6



$r = \sin x$



$h = b$

b) cross sections isosceles Δ

$$\frac{1}{2}bh = \frac{1}{2}(2 \sin x)^2$$

$$\int_0^\pi \frac{1}{2}(2 \sin x)^2 dx$$

$\frac{1}{2} \pi r^2$

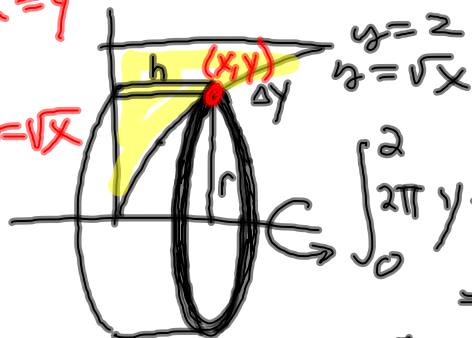
$$V = \int_0^\pi \frac{1}{2} \pi (\sin x)^2 dx$$

Jan 20-9:49 AM

shells

$h = x = y^2$

$r = y = \sqrt{x}$



$$\int_0^2 2\pi y \cdot y^2 dy = 8\pi$$



$\Delta V = 2\pi r h \Delta y$

$\lim_{\Delta y \rightarrow 0} \sum 2\pi r h \Delta y$

horiz

$\int_c^d 2\pi r h dy$

need r, h in terms of y

or

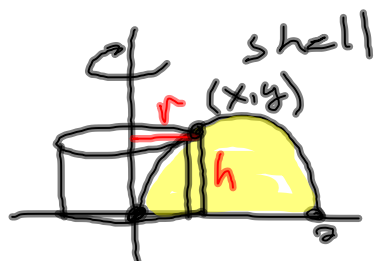
$\int_a^b 2\pi r h dx$

vertical rect.

need r, h in terms of x

Jan 20-10:00 AM

region: bounded by
 $y = -x(x-2) = -x^2 + 2x$, x axis



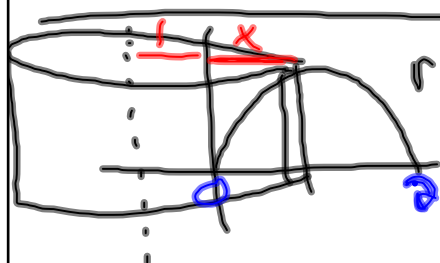
rotate around y axis

$$h = y = -x^2 + 2x$$

$$r = x$$

$$\int 2\pi r h \, dx$$

$$\int_0^2 2\pi \overset{r}{x} \overset{h}{(-x^2 + 2x)} \, dx$$



$r = x+1$
 washer
 cake

rotate around $x = -1$

$$\int_0^2 2\pi (x+1) (-x^2 + 2x) \, dx$$

Jan 20-10:26 AM